ABSTRACT

The invention provides a method of forming a polycrystalline semiconductor film on a supporting substrate of foreign material. The method involves depositing a metal film onto the substrate, forming a film of metal oxide and/or hydroxide on a substrate of the metal, and forming a layer of an amorphous semiconductor material over a surface of the metal oxide and/or hydroxide film. The entire sample is then heated to a temperature at which the semiconductor layer is absorbed into the metal layer and deposited as a polycrystalline layer onto the target surface by metal-induced crystallization. The metal is left as an overlayer covering the deposited polycrystalline layer, with semiconductor inclusions in the metal layer. The polycrystalline semiconductor film and the overlayer are generated by porous interfacial metal oxide nd/or hydroxide film. The metal in the overlayer and the interfacial metal oxide and/or hydroxide film are then removed with an etch which underetches the semiconductor inclusions to form freestanding islands. Finally, the freestanding semiconductor "islands" are removed from the surface of the polycrystalline semiconductor layer by a lift-off process.